of the top mirror layer (or next layer down in the alternative embodiment) of the optoelectronic device. This causes a reduction in the reflectivity of the resonant reflector in those regions that correspond to the etched regions of the first material layer (or top mirror layer). The difference in reflectivity can be used to provide mode control for optoelectronic devices.

B1

Please replace the paragraph beginning on page 10, line 1 with the following rewritten paragraph:

B2

The first material layer 56 preferably has a refractive index that is less than the refractive index of the second material layer 58, and the first and second material layers 56 and 58 preferably have a refractive index that is less than the refractive index of the top mirror layer 52 of the optoelectronic device 54. In one example, the first material layer 56 is SiO_2, the second material layer 58 is Si_3N_4 or TiO_2, and the top mirror layer 52 is AlGaAs, although other suitable material systems are contemplated. Each layer is preferably an odd multiple of one-quarter wavelength ($\lambda/4$) thick. This causes a reduction in reflectivity of the resonant reflector 50 in those regions that correspond to the etched regions 60 (see Figure 3B) in the first material layer 56, that is, those regions that are filled with the second material layer 58. By designing the etched regions to circumscribe the desired optical cavity, this difference in reflectivity can be used to help provide mode control for VCSEL 54.

Please replace the paragraph beginning at page 11, line 6, with the following rewritten paragraph:

B3

Another illustrative approach for controlling transverse modes of an optoelectronic device is shown in Figure 4. Figure 4 is a schematic cross-sectional side view of a planar, current-guided, GaAs/AlGaAs top surface emitting vertical cavity laser, as in Figure 1, with another illustrative top mounted mode control resonant reflector 70. In this embodiment, the resonant reflector 70 is formed by etching down into but not all the way through one or more of

the top mirror layers 72 of the optoelectronic device. The etched region, generally shown at 74, preferably circumscribes the desired optical cavity of the optoelectronic device, and has a depth that causes a phase shift that reduces the reflectivity of the resonant reflector 70 at the desired operating wavelength, such as a depth that corresponds to an odd multiple of $\lambda/4$. To provide further differentiation, a cap mirror 76 having one or more additional layers may be provided on selected non-patterned regions 78 of the top mirror layer 72, such as over the desired optical cavity of the optoelectronic device. The cap mirror 76 may include one or more periods of a conventional semiconductor DBR mirror, or more preferably, a narrow band dielectric reflection filter. A metal layer may be provided on selected regions of the top mirror layer 72. The metal layer may function as a top contact layer.

B3

Please replace the paragraph beginning at page 13, line 24, with the following rewritten paragraph:

Figures 7A-7D are schematic cross-sectional side views showing a first illustrative method for making the resonant reflector of Figure 6. In this illustrative embodiment, a first substantially planar layer of material 94 is provided on, for example, a top mirror layer 104 of a conventional DBR mirror. The top mirror layer 104 preferably has a refractive index that is higher than the refractive index of the first layer of material 94. The top mirror layer 104 may be, for example, AlGaAs, and the first layer of material 94 may be, for example, SiO2, or a polymer such as polyamide or Benzocyclobuthene (BCB).

B4

Please replace the paragraph beginning at page 14, line 4 with the following rewritten paragraph:

The first layer of material is then patterned, as shown in Figure 7A. This is typically done using a conventional etch process. As shown in Figure 7B, the patterned first layer of

material 104 is then heated, which causes it to reflow. This results in a non-planar top surface 98. Then, and as shown in Figure 7C, a second layer of material 96 is provided over the first layer of material 94. The top surface 105 of the second layer of material 96 is preferably substantially planar, but it may be non-planar if desired. The second layer of material 96 preferably has a refractive index that is higher than the refractive index of the first layer of material 94. The second layer of material 96 may be, for example, TiO2, Si3N4, a polymer, or any other suitable material. When desired, the top surface 105 of the second layer of material 96 may be planarized using any suitable method including, for example, reflowing the second layer of material 96, mechanical, chemical or chemical-mechanical polishing (CMP) the second layer of material 96, etc. In some embodiments, the top surface 105 is left non-planar.

B4

Please replace the paragraph beginning on page 14, line 25 with the following rewritten paragraph:

Figures 8A-8E are schematic cross-sectional side views showing another illustrative method for making the resonant reflector of Figure 6. In this illustrative embodiment, and as shown in Figure 8A, a first substantially planar layer of material 94 is provided on, for example, a top mirror layer 104 of a conventional DBR mirror. The top mirror layer 104 preferably has a refractive index that is higher than the refractive index of the first layer of material 94. The top mirror layer 104 may be, for example, AlGaAs, and the first layer of material 94 may be, for example, SiO2, or any other suitable material. Next, a photoresist layer 110 is provided and patterned on the first layer of material 94, preferably forming an island of photoresist above the desired optical cavity of the optoelectronic device.

B5

Please replace the paragraph beginning at page 15, line 13, with the following rewritten paragraph:

As shown in Figure 8D, a second layer of material 96 is then provided over the first layer of material 94. The second layer of material 96 preferably has a refractive index that is higher than the refractive index of the first layer of material 94. The second layer of material 96 is preferably provided over the entire top surface of the resonant reflector, and etched away in those regions where a top contact 102 is desired. Once the second layer of material 96 is etched, a B6 contact layer 102 is provided on the exposed regions of the top mirror layer 104. The contact layer 102 provides electrical contact to the top mirror layer 104. Preferably, the top surface of the second layer of material 96 is substantially planar. As shown in Figure 8E, a cap mirror 106 may be provided above the second layer of material 96, if desired. The cap mirror 106 may include one or more periods of a conventional semiconductor DBR mirror, or more preferably, a narrow band dielectric reflection filter.

Please replace the paragraph beginning at page 16, line 17 with the following rewritten paragraph:

After the etching step, and as shown in Figure 9D, a second layer of material 96 may be provided over the first layer of material 94. Like above, the second layer of material 96 B7 preferably has a refractive index that is higher than the refractive index of the first layer of material 94. The second layer of material 96 is preferably provided over the entire top surface of the resonant reflector, and etched away in those regions where a top contact 102 is desired. Once the second layer of material 96 is etched, a contact layer 102 is provided on the exposed regions of the top mirror layer 104. The contact layer 102 provides electrical contact to the top mirror layer 104. Preferably, the top surface of the second layer of material 96 is substantially planar.